IN THE CLAIMS:

1. (Original) A non-contact rotational position sensor comprising:

a permanent magnet having a circular or arc-shaped outer circumference;

a shaft for supporting and fixing said permanent magnet;

upper and lower magnetic plates sandwiching said permanent magnet from above and below, at least one of said upper and lower magnetic plates being horizontally separated from each other with an air gap formed therebetween;

at least one protruded magnetic substance portion disposed between said upper and lower magnetic plates; and

a magnetic sensitive device disposed on a protruded surface of said protruded magnetic substance portion,

said permanent magnet and said shaft constituting a rotor which is rotatable relative to said upper and lower magnetic plates vertically spaced from each other,

said permanent magnetic being magnetized substantially in the direction of a rotating axis, whereby the amount of magnetic flux passing said magnetic sensitive device is varied with rotation of said permanent magnet,

wherein said upper and lower magnetic plates sandwiching said permanent magnet from above and below are formed of magnetic plates each having protruded portions at opposite ends instead of providing said protruded magnetic substance portion on at least one of said upper and lower magnetic plates, said protruded portions being bent to form pairs of upper and lower protruded portions, and said magnetic sensitive device is inserted in an air gap

formed between protruded surfaces of every two upper and lower protruded portions.

2. (Original) A non-contact rotational position sensor comprising:

a rotating axis;

an annular or semi-annular magnet fixed to said rotating axis;

magnetic substance assemblies arranged in opposing relation to sandwich said magnet therebetween with a spacing greater than a thickness of said magnet left between said magnetic substance assemblies in the axial direction of said rotating axis, such that a uniform air gap is formed between said magnet and a surface of each of said magnetic substance assemblies confronting said magnet;

a pair of small air gaps formed in said magnetic substance assemblies and being smaller than said air gap; and

a magnetic sensitive device disposed in said small air gap,

wherein said magnetic substance assemblies comprise a pair of rectangularly-shaped magnetic plates, and at least one of said pair of rectangular magnetic plates has a split air gap formed along an imaginary plane passing an axial center line of said rotating axis, said air gap splitting said rectangular magnetic plate into two parts.

3. (Original) A non-contact rotational position sensor comprising:

a rotating axis;

an annular or semi-annular magnet fixed to said rotating axis;

magnetic substance assemblies arranged in opposing relation to sandwich said magnet therebetween with a spacing greater than a thickness of said magnet left between said magnetic substance assemblies in the axial direction of said rotating axis, such that a uniform air gap is formed between said magnet and a surface of each of said magnetic substance assemblies confronting said magnet;

a pair of small air gaps formed in said magnetic substance assemblies and being smaller than said air gap; and

a magnetic sensitive device disposed in said small air gap,

wherein said pair of small air gaps are formed in symmetrical positions with respect to said rotating axis situated therebetween.

4. (Original) A non-contact rotational position sensor according to claim 3, wherein said pair of small air gaps are each formed between confronting surfaces of a pair of protrusions protruded from said magnetic plate assemblies in directions in which said protrusions come closer to each other.

5. (Currently amended) A throttle valve assembly comprising:

an annular or semi-annular magnet attached to one end of a throttle valve;

a resin cover attached to a body in which said throttle valve is mounted;

an auxiliary ~~eaver~~ cover attached to said resin cover;

magnetic path forming members attached to said resin cover and said auxiliary cover, respectively, and forming magnetic paths with said annular or semi-annular magnet situated therebetween;

a magnetic flux converging portion formed in each of said magnetic paths and concentrating a magnetic flux passing said magnetic path to a particular position; and

a magnetic sensitive device attached to said magnetic flux converging portion and detecting change of the magnetic flux in said magnetic flux converging portion caused upon rotation of said throttle valve.

6. (Original) A throttle valve assembly according to claim 5, further comprising:

a motor for driving said throttle valve; and

a magnetic substance arranged between said motor and said magnetic paths.

7. (Original) A throttle valve assembly according to claim 6, wherein said magnetic substance is in the form of a gear for transmitting rotation of said motor to a rotating shaft of said throttle valve, or in the form of a rotating shaft of said gear.

8. (Original) A throttle valve assembly according to claim 5, wherein said resin cover has a hole for insertion of a rotating shaft provided with said throttle valve fitted thereon;

said magnetic path forming member attached to the side of said resin cover has a hole formed at the center thereof and having a diameter greater than a diameter of said rotating shaft, but smaller than a diameter of said annular or semi-annular magnet; and

said annular or semi-annular magnet is detachably attached to an end of said rotating shaft inserted through said hole in said magnetic path forming member.

9. (New) A non-contact rotational position sensor comprising:

a permanent magnet having a circular or arc-shaped outer circumference;

a shaft for supporting and fixing said permanent magnet;

upper and lower magnetic plates sandwiching said permanent magnet from above and below, at least one of said upper and lower magnetic plates being horizontally separated from each other with an air gap formed therebetween;

at least one protruded magnetic substance portion disposed between said upper and lower magnetic plates; and

a magnetic sensitive device disposed on a protruded surface of said protruded magnetic substance portion,

said permanent magnet and said shaft constituting a rotor which is rotatable relative to said upper and lower magnetic plates vertically spaced from each other,

said permanent magnetic being magnetized substantially in the direction of a rotating axis, whereby the amount of magnetic flux passing said magnetic sensitive device is varied with rotation of said permanent magnet.

10. (New) A non-contact rotational position sensor according to Claim 9, wherein said permanent magnet is in the form of a ring.

11. (New) A non-contact rotational position sensor according to Claim 9, wherein said permanent magnet is in the form of an arc having a certain width in the radial direction.

12. (New) A non-contact rotational position sensor according to Claim 9, wherein said permanent magnet is in the form of a disk.

13. (New) A non-contact rotational position sensor according to Claim 9, wherein each of air gaps between said permanent magnet and said upper and lower magnetic plates has a width of not less than 0.5 mm, preferably approximately 1 mm.

14. (New) A non-contact rotational position sensor comprising:

a permanent magnet having a circular or arc-shaped outer circumference;

a shaft for supporting and fixing said permanent magnet;

magnetic plates sandwiching said permanent magnet from opposite outer sides in the radial direction;

a magnetic circuit having a portion formed by narrowing part of each of said magnetic plates for concentrating a magnetic flux generated from said permanent magnet;

an air gap formed at a fore end of the magnetic flux concentrating portion of said magnetic circuit; and

a magnetic sensitive device disposed in said air gap,

said permanent magnet and said shaft constituting a rotor which is rotatable relative to said magnetic plates arranged outwardly of said permanent magnet in the radial direction,

said permanent magnet being magnetized substantially in the radial direction, whereby the amount of magnetic flux passing said magnetic sensitive device is varied with rotation of said permanent magnet.

15. (New) A non-contact rotational position sensor according to Claim 14, wherein said permanent magnet is magnetized into an at least double-pole magnet when looking round an outer circumferential surface of said permanent magnet in the rotating direction.

16. (New) A non-contact rotational position sensor according to Claim 9, wherein the magnetic flux density in magnetic materials used in said sensor is not higher than 0.5 T.

17. (New) A non-contact rotational position sensor according to Claim 9, wherein said magnetic sensitive device is a Hall device or a Hall IC.

18. (New) A non-contact rotational position sensor according to Claim 9, wherein said magnetic plate and a member for fixing said magnetic plate are integrated into a one-piece unit by resin molding.

19. (New) A non-contact rotational position sensor comprising a permanent magnet as a magnetic filed generating source, a magnetic substance yoke for forming a magnetic path, and a magnetic sensitive device for detecting a magnetic field, wherein a magnetic substance cover is attached to a housing cover of said non-contact rotational position sensor, or another dedicated cover is disposed on a housing cover of said non-contact rotational position sensor and a magnetic substance cover is attached to said dedicated cover, said magnetic substance cover preventing any external magnetic substance situated near said non-contact rotational position sensor from affecting a magnetic flux density signal detected by said magnetic sensitive device.

20. (New) A non-contact rotational position sensor according to Claim 9, wherein at least one hole is formed in said magnetic plate near said protruded magnetic substance portion or said magnetic flux concentrating portion.

21. (New) A non-contact rotational position sensor comprising:

a rotating axis;

an annular or semi-annular magnet fixed to said rotating axis;

magnetic substance assemblies arranged in opposing relation to sandwich said magnet therebetween with a spacing greater than a thickness of said magnet left between said magnetic substance assemblies in the axial direction of said rotating axis, such that a uniform air gap is formed between said magnet and a surface of each of said magnetic substance assemblies confronting said magnet;

a pair of small air gaps formed in said magnetic substance assemblies and being smaller than said air gap; and

a magnetic sensitive device disposed in said small air gap.

22. (New) A non-contact rotational position sensor according to Claim 21, wherein said magnetic substance assemblies comprise a pair of magnetic plates.

23. (New) A non-contact rotational position sensor according to Claim 22, wherein said pair of magnetic plates are each rectangular in shape.

24. (New) A non-contact rotational position sensor according to Claim 21, wherein said magnetic substance assemblies comprise a pair of magnetic plates;

at least one of said pair of magnetic plates has a split air gap formed along an imaginary plane passing an axial center line of said rotating axis, said air gap splitting said magnetic plate into two parts; and

said pair of small air gaps are formed in symmetrical positions with respect to said split air gap situated therebetween.

25. (New) A non-contact rotational position sensor comprising:

a permanent magnet;

a magnetic path member allowing a magnetic flux generated from said permanent magnet to pass therethrough;

a magnetic sensitive device disposed in said magnetic path and detecting change of the magnetic flux in said magnetic path caused upon relative rotation between said magnetic path member and said permanent magnet; and

a slit formed in said magnetic path member for adjusting a nonlinear characteristic between change of the magnetic flux in said magnetic path and a rotational angle resulted from the relative rotation between said magnetic path member and said permanent magnet.

26. (New) A non-contact rotational position sensor comprising:

a permanent magnet;

a magnetic path member allowing a magnetic flux generated from said permanent magnet to pass therethrough;

a magnetic sensitive device disposed in said magnetic path and detecting change of the magnetic flux in said magnetic path caused upon relative rotation between said magnetic path member and said permanent magnet; and

a magnetic resistance forming slit formed in said magnetic path member for converging the magnetic flux passing said magnetic path member to a position where said magnetic sensitive device is attached.

27. (New) A non-contact rotational position sensor comprising:

a permanent magnet;

a magnetic path member allowing a magnetic flux generated from said permanent magnet to pass therethrough;

a magnetic flux converging portion provided in said magnetic path member for converging the magnetic flux passing said magnetic path member to a particular position;

a magnetic sensitive device disposed in said magnetic flux converging portion and detecting change of the magnetic flux in said magnetic path caused upon relative rotation between said magnetic path member and said permanent magnet; and

a magnetic member for magnetic shielding arranged to surround said magnetic path member in a non-contact state with respect to said magnetic path member.